Appendix A

Data Tables

Haziness Index in U.S. National Parks for the Clearest Days, 1990 - 1999: Average of Best 20 percent days, in deciviews (dv)

Haziness Index in U.S. National Parks for the Haziest Days, 1990 -1999: Average of Worst 20 percent days, in deciviews (dv)

Precipitation-Weighted Mean Sulfate Ion Concentration in U.S. National Parks, 1990 - 1999: Annual Average in μeq/liter

Sulfate Ion Wet Deposition in U.S. National Parks, 1990 - 1999: Annual Average in kilograms/hectare

Precipitation-Weighted Mean Nitrate Ion Concentration in U.S. National Parks, 1990 - 1999: Annual Average in μeq/liter

Inorganic Nitrogen Wet Deposition From Nitrate and Ammonium in U.S. National Parks, 1990 -1999: Annual Average in kilograms/hectare

Ozone Levels in U.S. National Parks, 1990 - 1999: Average of the Daily 1-hour Maximum, May-September, in ppb

Ozone Levels in U.S. National Parks, 1990 - 1999: Annual 4th Highest 8-hour Average, in ppb

Haziness Index in U.S. National Parks for the Clearest Days
1990 – 1999: Average of Best 20 percent days, in deciviews (dv)

Park	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, dv/yr
Acadia, ME		10.6	10.7	10.2	10.6	9.8	9.6	9.1	9.7	9.3	8.7	9.8	⊙	⇩	-0.20
Badlands, ND		7.6	7.4	7.2	7.4	7.9	6.6	7.9	7.1	7.4	6.6	7.3	○	⇩	-0.07
Bandelier, NM		–	–	–	7	6.7	5.9	6.0	6.3	6.8	6.7	6.5	○	⇧	+0.00
Big Bend, TX		8.4	8.2	7.5	7.7	8.5	7.8	–	6.9	9.3	8.8	8.1	⊙	⇧	+0.06
Bryce Canyon, UT		4.9	5.0	5.7	4.8	4.5	4.3	4.1	4.6	4.5	4.7	4.7	●	⇩	-0.07
Canyonlands, UT		5.9	6.2	6.3	6	6.5	5.7	4.9	6.0	5.8	5.8	5.9	⊙	⇩	-0.04
Chiricahua, AZ		–	6.8	6.6	6.4	6.6	6.8	6.4	6.7	6.6	6.4	6.6	○	⇩	-0.02
Crater Lake, OR		–	–	5.1	5.1	–	3.7	4.3	4.3	4.1	4.1	4.4	●	⇩	-0.14
Denali, AK		–	3.5	3.4	3.7	3.4	3.2	3.7	4.1	3.1	3.2	3.5	●	⇩	-0.03
Glacier, MT		8.0	9.8	8.9	9.0	8.5	7.9	8	7.9	8.3	7.5	8.4	⊙	⇩	-0.20
Grand Canyon, AZ		–	–	–	5.7	5.3	3.9	4.0	4.4	4.8	5.2	5.1	●	–	+0.00
Great Basin, NV		5.1	5.5	–	5.1	4.9	5.0	5.1	5.0	5.0	5.3	4.8	●	⇩	-0.02
Great Sand Dunes, CO		6.6	6.7	6.3	6.1	5.4	4.8	4.9	5.3	6.6	5.5	5.8	⊙	⇩	-0.17
Great Smoky Mts., TN/NC		15.3	13.8	13.6	14.4	13.8	13.5	15.3	15.1	14.4	15.2	14.4	●	⇧	+0.09
Guadalupe Mts., TX		–	–	7.3	8.0	7.5	8.3	7.8	7.2	7.5	7.6	7.7	○	⇩	-0.01
Lassen Volcanic, CA		4.5	4.3	4.7	5.1	4.4	3.9	4.0	4.4	4.3	4.1	4.4	●	⇩	-0.06
Mammoth Cave, KY		–	–	16.3	17.3	–	15.5	16	16.8	16.2	16.1	16.3	●	⇩	-0.03
Mesa Verde, CO		5.5	6.1	5.6	5.7	6.3	4.9	5.0	–	5.9	5.7	5.6	⊙	⇧	+0.01
Mt. Rainier, WA		–	7.0	7.2	7.5	6.3	5.0	5.4	5.5	5.0	5.3	6.0	⊙	⇩	-0.28
Petrified Forest, AZ		–	8.0	7.6	6.2	6.2	6.2	6.1	6.9	6.8	6.7	6.7	○	⇩	-0.10
Pinnacles, CA		9.4	9.3	9.1	8.7	9.4	8.3	8.0	8.9	–	8.7	8.9	⊙	⇩	-0.12
Point Reyes, CA		9.1	8.8	8.6	9.5	8.1	7.9	8.1	–	8.7	8.9	8.6	⊙	⇩	-0.08
Redwood, CA		6.7	6.8	6.9	6.7	6.3	6.6	5.3	6.1	5.5	6.2	6.3	⊙	⇩	-0.10
Rocky Mountain, CO		4.3	4.1	3.9	4.5	5.0	4.3	3.9	4.2	4.8	3.9	4.3	●	–	+0.00
Shenandoah, VA		14.1	13.4	12.6	14.2	12.3	12.8	14.2	13.5	11.8	11.9	13.1	●	⇩	-0.15
Tonto, AZ		–	8.2	–	7.7	7.2	7.7	7.7	7.6	7.0	8.1	7.7	○	⇩	-0.04
Yellowstone, WY		–	–	5.9	5.2	4.7	4.8	5	–	–	3.8	4.9	●	⇩	-0.23
Yosemite, CA		5.4	5.6	4.8	4.8	4.5	5.3	4.6	5.5	4.7	5.0	5.0	●	⇩	-0.02
	Average	7.7	7.5	7.6	7.5	6.9	6.8	6.8	7.2	7.1	7.0	7.2			

Symbols: "–" indicates insufficient or no data, or no trend

Park Air Quality Status		Trend	
Much Worse than NPS Average	●	Significant Improvement**	⇩
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	⇧
Much Better than NPS Average	●	No Trend	–

**Statistically significant at a=0.15

Haziness Index in U.S. National Parks for the Haziest Days
1990 – 1999: Average of Worst 20 percent days, in deciviews (dv)

Park	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, dv/yr
Acadia, ME		24.9	24.8	26.2	26.2	27.4	23.5	24.0	23.1	23.9	24.2	24.8	●	⇩	-0.15
Badlands, ND		17.9	18.1	18.4	17.3	18.2	17.2	17.3	17.0	19.0	17.1	17.8	○	⇩	-0.09
Bandelier, NM		–	–	–	13.1	12.5	13.0	12.7	13.1	14.4	12.8	13.1	⊙	⇧	+0.05
Big Bend, TX		16.2	17.1	16.3	16.8	17.4	17.5	–	17.3	20.9	19.3	17.6	○	↑	+0.35
Bryce Canyon, UT		11.4	11.5	11.2	12.1	11.5	11.1	12.9	12.4	11.5	11.7	11.7	●	⇧	+0.04
Canyonlands, UT		12.9	14.1	13.2	12.5	11.9	11.2	12.8	11.9	12.2	11.8	12.5	●	⇩	-0.17
Chiricahua, AZ		–	13.1	13.2	13.7	14.0	14.1	13.4	12.9	15.1	13.0	13.6	⊙	⇧	+0.06
Crater Lake, OR		–	–	13.3	13.8	–	12.8	15.6	12.1	13.4	13.5	13.5	⊙	⇧	+0.02
Denali, AK		–	12.3	9.2	11.2	10.4	9.4	9.5	12.1	8.2	9.3	10.2	●	⇩	-0.35
Glacier, MT		19.5	19.6	19.1	19.0	19.6	18.1	17.9	17.4	20.4	19.4	19.0	⊙	⇩	-0.17
Grand Canyon, AZ		13.5	11.7	–	11.9	11.8	11.8	12.1	11.3	12.6	12.1	12.1	●	⇧	+0.01
Great Basin, NV		–	–	–	12.0	11.4	10.8	12.9	11.0	11.6	11.9	11.7	●	⇧	+0.05
Great Sand Dunes, CO		13.9	12.7	11.4	12.1	15.3	11.8	12.5	11.9	13.2	12.5	12.7	●	⇩	-0.02
Great Smoky Mts., TN/NC		32.8	29.6	30.7	30.9	31.6	30.6	31.2	30.9	31.8	30.5	31.1	●	–	+0.00
Guadalupe Mts., TX		–	–	14.7	15.4	16.2	16.2	15.2	16.6	17.8	18.1	16.3	○	↑	+0.46
Lassen Volcanic, CA		13.3	13.0	13.5	13.3	13.6	12.8	13.4	12.1	15.4	20.7	14.1	⊙	⇧	+0.10
Mammoth Cave, KY		–	–	30.7	31.5	–	30.3	30.5	29.9	30.5	29.6	30.4	●	⇩	-0.16
Mesa Verde, CO		12.6	11.5	11.2	12.0	11.8	11.9	12.7	–	12.2	13.9	12.2	●	↑	+0.12
Mt. Rainier, WA		–	21.0	20.7	20.0	20.2	18.7	18.9	18.6	20.3	19.7	19.8	⊙	⇩	-0.26
Petrified Forest, AZ		–	13.6	13.0	12.6	12.3	13.0	12.6	12.7	13.7	13.4	13.0	⊙	⇧	+0.02
Pinnacles, CA		19.5	19.1	19.0	18.3	17.7	18.5	17.9	17.7	–	19.3	18.6	⊙	⇩	-0.20
Point Reyes, CA		20.8	21.1	21.1	20.9	20.4	20.2	20.1	–	19.6	21.8	20.7	⊙	⇩	-0.15
Redwood, CA		19.7	18.9	19.7	18.0	17.3	18.5	18.0	18.9	16.7	20.1	18.6	⊙	⇩	-0.15
Rocky Mountain, CO		13.9	13.1	13.1	12.9	13.4	13.3	13.3	12.4	13.4	12.4	13.1	⊙	⇩	-0.09
Shenandoah, VA		30.9	32.4	31.3	32.6	31.9	30.4	29.3	29.9	30.3	28.4	30.7	●	⇩	-0.30
Tonto, AZ		–	14.2	–	15.3	13.8	15.2	14.8	14.2	14.9	15.4	14.7	○	⇧	+0.08
Yellowstone, WY		–	–	13.2	11.9	14.8	11.7	14.9	–	–	11.8	13.1	⊙	⇩	-0.02
Yosemite, CA		16.3	16.1	17.3	15.1	16.8	17.5	19.6	15.7	15.7	22.0	17.2	○	⇧	+0.23
	Average	18.2	17.2	17.5	16.9	16.7	16.5	16.9	16.5	17.3	17.3	16.9			

Symbols: "–" indicates insufficient or no data, or no trend

Park Air Quality Status		Trend	
Much Worse than NPS Average	●	Significant Improvement**	⇩
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	↑
Much Better than NPS Average	●	No Trend	–

**Statistically significant at a=0.15

Precipitation-Weighted Mean Sulfate Ion Concentration in U.S. National Parks
1990 – 1999: Annual Average in µeq/liter

Park	Year 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, µeq/l/yr
Acadia, ME	30.9	24.1	30.9	23.7	23.0	23.1	20.3	29.4	25.1	19.4	25.0	●	⇩	-0.72
Bandelier, NM	16.6	13.9	15.4	14.5	13.7	13.4	12.1	16.5	–	14.7	14.5	○	⇩	-0.28
Big Bend, TX	–	16.4	16.6	14.3	27.9	29.6	22.7	22.4	23.4	20.2	21.5	⊙	⇧	+0.76
Bryce Canyon, UT	14.3	–	–	–	14.0	11.9	–	15.2	10.8	9.2	12.5	⊙	⇩	-0.56
Buffalo River, AR	–	–	25.9	23.1	20.8	23.5	23.2	24.3	21.9	19.5	22.8	⊙	⇩	-0.56
Cape Cod, MA	33.8	–	32.0	31.2	–	31.4	–	–	–	27.1	31.1	●	–	–
Capulin Volcano, NM	14.8	14.1	16.9	15.1	15.0	13.4	17.8	–	10.1	13.5	14.5	○	⇩	-0.26
Craters of the Moon, ID	12.9	11.4	10.7	9.6	8.2	8.6	4.9	6.5	7.2	6.8	8.7	⊙	⇩	-0.71
Denali, AK	3.5	4.1	3.8	3.9	3.8	2.5	2.4	3.5	2.3	2.2	3.2	●	⇩	-0.14
Everglades, FL	15.2	14.0	–	–	15.8	14.5	15.4	–	16.8	13.4	15.0	○	⇧	+0.04
Gila Cliff Dwellings, NM	21.3	15.6	19.0	20.5	18.4	16.8	18.1	22.8	17.7	19.3	18.9	⊙	⇩	-0.13
Glacier, MT	7.2	7.1	8.1	7.8	7.6	5.4	4.9	7.0	6.1	5.3	6.6	●	⇩	-0.22
Grand Canyon, AZ	14.6	–	10.2	10.2	12.4	8.8	11.0	–	9.0	11.5	10.9	⊙	⇩	-0.22
Great Basin, NV	14.8	11.8	16.5	–	12.4	11.0	10.1	14.3	10.1	–	12.6	⊙	⇩	-0.51
Great Smoky Mts., TN/NC	32.0	36.1	30.1	33.9	24.3	20.9	25.0	30.2	28.6	24.0	28.5	●	⇩	-0.99
Guadalupe Mts., TX	–	13.7	24.1	22.7	26.8	20.1	36.6	23.4	27.9	25.1	24.5	●	⇧	+1.14
Indiana Dunes, IN	51.3	59.6	66.8	57.0	48.3	56.2	47.3	47.1	50.1	49.2	53.3	●	⇩	-0.98
Isle Royale (Chassell), MI	26.8	25.6	29.9	22.4	21.4	21.0	18.4	16.5	18.9	19.2	22.0	⊙	⇩	-1.27
Little Big Horn, MT	16.4	12.7	14.6	13.9	13.8	11.1	12.6	13.3	12.8	10.6	13.2	○	⇩	-0.44
Mesa Verde, CO	27.3	21.1	18.7	16.0	21.2	18.1	20.6	16.7	18.6	20.9	19.9	⊙	⇩	-0.28
North Cascades, WA	6.1	6.8	6.3	6.5	–	4.4	5.2	5.0	4.2	4.9	5.5	●	⇩	-0.24
Olympic, WA	–	4.5	5.0	5.2	5.0	4.7	–	5.3	4.3	5.7	4.9	●	⇧	+0.07
Organ Pipe Cactus, AZ	16.8	16.9	10.8	7.6	11.9	16.6	28.5	16.8	–	14.5	15.6	○	⇧	+0.09
Rocky Mountain, CO	13.7	14.6	14.8	11.5	16.1	12.8	13.1	10.5	13.5	11.6	13.2	○	⇩	-0.25
Sequoia, CA	10.2	5.7	8.0	5.2	5.2	3.9	2.4	2.9	4.9	–	5.4	●	⇩	-0.66
Shenandoah, VA	31.2	34.5	23.0	30.9	29.2	–	28.4	29.3	–	27.7	29.3	●	⇩	-0.39
Theo. Roosevelt, ND	24.0	16.8	18.4	17.3	20.0	16.7	15.8	–	–	14.7	18.0	⊙	⇩	-0.54
Yellowstone, WY	12.0	11.0	8.1	8.6	9.7	5.8	4.8	6.9	6.7	7.2	8.1	⊙	⇩	-0.57
Yosemite, CA	–	5.2	3.5	–	4.5	2.7	2.3	2.8	4.6	3.6	3.6	●	⇩	-0.16
Average	19.5	16.7	18.1	17.3	16.7	15.3	16.3	16.2	14.8	15.6	16.7			

Symbols:

"–" indicates insufficient or no data

Park Air Quality Status		Trend	
Much Worse than NPS Average	●	Significant Improvement**	⇩
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	⇧
Much Better than NPS Average	●	No Trend	–

**Statistically significant at a=0.15

Sulfate Ion Wet Deposition in U.S. National Parks
1990 – 1999: Annual Average in kilograms/hectare

Park	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, Kg/ha/yr
Acadia, ME		22.7	16.5	18.1	16.9	15.9	16.5	15.0	16.2	17.7	12.5	16.8	●	⇩	-0.51
Bandelier, NM		3.2	3.7	2.6	3.3	2.9	2.1	2.0	4.0	–	2.8	3.0	○	⇩	-0.09
Big Bend, TX		–	3.9	3.0	2.3	3.2	3.1	3.0	3.2	2.7	2.1	3.0	○	⇩	-0.14
Bryce Canyon, UT		2.4	–	–	–	2.2	2.2	–	3.3	2.7	1.5	2.4	⊙	⇩	-0.04
Buffalo River, AR		–	–	12.7	13.0	12.1	11.3	13.1	10.1	10.8	8.9	11.5	⊙	⇩	-0.56
Cape Cod, MA		16.3	–	16.4	19.6	–	16.4	–	–	–	13.5	16.4	●	–	–
Capulin Volcano, NM		3.3	3.9	3.8	4.1	3.4	3.8	4.3	–	2.3	3.5	3.6	○	⇩	-0.03
Craters of the Moon, ID		1.8	1.7	1.0	2.0	0.9	1.9	0.8	1.0	1.6	0.7	1.3	●	⇩	-0.08
Denali, AK		1.1	0.8	0.7	0.7	0.6	0.4	0.4	0.6	0.4	0.4	0.6	●	⇩	-0.06
Everglades, FL		9.1	10.8	–	–	13.0	12.1	9.2	–	13.3	9.9	11.1	⊙	⇧	+0.09
Gila Cliff Dwellings, NM		3.8	3.3	4.3	4.6	3.4	2.5	3.2	4.7	2.4	2.7	3.5	○	⇩	-0.12
Glacier, MT		3.9	2.4	2.8	3.1	2.5	2.7	2.7	2.4	2.3	1.7	2.6	○	⇩	-0.15
Grand Canyon, AZ		3.0	–	2.2	2.1	1.8	2.1	1.7	–	1.9	1.9	2.1	⊙	⇩	-0.06
Great Basin, NV		2.7	1.9	1.8	–	2.1	2.0	1.8	2.6	1.9	–	2.1	⊙	⇩	-0.01
Great Smoky Mts., TN/NC		24.7	28.0	22.2	25.9	22.4	14.5	23.6	27.2	22.4	16.7	22.8	●	⇩	-0.72
Guadalupe Mts., TX		–	4.2	5.7	4.0	4.0	4.0	8.5	4.6	4.8	4.7	4.9	⊙	⇧	+0.06
Indiana Dunes, IN		34.4	28.1	25.1	33.7	19.5	22.7	25.6	20.4	23.6	17.6	25.1	●	⇩	-1.31
Isle Royale (Chassell), MI		10.5	11.0	10.1	7.8	6.9	8.9	7.8	5.4	6.5	8.0	8.3	⊙	⇩	-0.52
Little Big Horn, MT		2.2	2.1	2.4	2.3	1.9	1.8	1.8	2.0	2.1	1.5	2.0	⊙	⇩	-0.07
Mesa Verde, CO		5.6	5.0	4.5	4.0	4.7	3.7	4.5	4.1	3.8	2.9	4.3	⊙	⇩	-0.22
North Cascades, WA		8.4	6.3	5.1	4.8	–	5.0	5.6	6.4	3.9	5.5	5.7	⊙	⇩	-0.20
Olympic, WA		–	7.2	7.1	6.1	8.2	6.9	–	10.9	8.1	11.5	8.3	⊙	↑	+0.42
Organ Pipe Cactus, AZ		2.6	1.7	2.2	1.1	1.7	1.6	2.0	1.8	–	1.5	1.8	●	⇩	-0.08
Rocky Mountain, CO		3.1	2.7	2.6	2.3	2.7	3.3	2.3	2.5	2.8	3.0	2.7	○	⇧	+0.01
Sequoia, CA		2.6	1.9	2.8	2.8	2.1	2.9	1.8	1.2	3.6	–	2.4	⊙	⇧	+0.02
Shenandoah, VA		23.6	17.8	18.7	22.4	19.3	–	23.4	17.8	–	18.8	20.2	●	⇩	-0.07
Theo. Roosevelt, ND		3.5	2.9	2.8	3.8	4.2	3.9	2.8	–	–	2.1	3.3	○	⇩	-0.09
Yellowstone, WY		2.1	2.4	1.8	1.6	1.7	1.1	1.0	1.6	1.1	1.3	1.6	●	⇩	-0.12
Yosemite, CA		–	2.5	1.5	–	1.8	2.5	2.1	0.9	3.8	1.7	2.1	⊙	⇩	-0.01
	Average	8.2	7.4	6.8	7.5	6.6	6.2	6.9	6.9	6.5	5.7	6.7			

Symbols:

"–" indicates insufficient or no data, or no trend

Park Air Quality Status		Trend	
Much Worse than NPS Average	●	Significant Improvement**	⇩
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	↑
Much Better than NPS Average	●	No Trend	–

**Statistically significant at a=0.15

Precipitation-Weighted Mean Nitrate Ion Concentration in U.S. National Parks
1990 – 1999: Annual Average in µeq/liter

Park	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, µeq/l/yr
Acadia, ME		15.3	11.1	16.4	12.3	10.2	11.5	11.3	15.9	12.7	10.8	12.7	⊙	⇩	-0.19
Bandelier, NM		12.5	12.2	12.3	12.2	13.8	16.7	11.6	17.0	–	17.4	14.0	○	↑	+0.60
Big Bend, TX		–	10.3	10.2	10.7	17.7	15.5	13.5	13.3	16.8	13.1	13.5	○	⇧	+0.47
Bryce Canyon, UT		15.4	–	–	–	14.1	10.7	–	15.4	11.4	15.0	13.7	○	⇩	-0.04
Buffalo River, AR		–	–	14.2	14.1	12.4	14.4	14.8	15.4	13.8	13.2	14.0	○	–	0.00
Cape Cod, MA		15.2	–	17.2	13.6	–	19.5	–	–	–	13.4	15.8	⊙	–	–
Capulin Volcano, NM		13.5	12.7	15.8	14.9	16.4	14.0	17.5	–	12.1	15.1	14.7	⊙	⇧	+0.23
Craters of the Moon, ID		9.8	11.6	12.5	9.8	14.3	10.7	6.8	11.1	11.5	10.7	10.9	⊙	–	0.00
Denali, AK		1.8	4.2	2.3	2.4	2.8	1.4	1.4	3.3	1.3	2.0	2.3	●	⇩	-0.07
Everglades, FL		9.6	8.4	–	–	9.3	8.2	8.5	–	8.4	8.0	8.6	⊙	↓	-0.15
Gila Cliff Dwellings, NM		12.9	9.3	9.9	11.2	12.2	11.8	14.2	13.5	12.6	17.1	12.5	⊙	↑	+0.64
Glacier, MT		5.8	6.3	6.8	6.3	7.4	5.1	5.7	7.7	5.9	5.7	6.3	●	⇩	-0.01
Grand Canyon, AZ		16.9	–	11.9	10.7	15.9	10.4	15.0	–	10.2	18.5	13.7	○	⇩	-0.11
Great Basin, NV		20.0	15.2	19.9	–	16.9	12.2	14.7	17.6	15.1	–	16.4	⊙	↓	-0.46
Great Smoky Mts., TN/NC		13.3	14.1	14.9	15.8	12.1	13.2	13.2	15.3	15.4	13.0	14.0	○	⇧	+0.03
Guadalupe Mts., TX		–	8.7	15.1	13.6	18.0	14.2	11.8	14.4	15.5	18.2	14.4	⊙	↑	+0.54
Indiana Dunes, IN		21.6	29.4	31.2	26.3	28.2	33.3	26.7	29.7	27.6	28.3	28.2	●	⇧	+0.26
Isle Royale (Chassell), MI		16.7	17.0	18.2	16.5	19.2	18.5	17.6	17.4	17.2	17.8	17.6	●	⇧	+0.08
Little Big Horn, MT		13.1	11.4	10.8	10.9	11.8	10.2	13.6	14.9	14.8	12.7	12.4	⊙	↑	+0.25
Mesa Verde, CO		19.4	14.3	14.1	11.9	17.8	14.1	19.5	15.4	14.7	21.9	16.3	⊙	⇧	+0.23
North Cascades, WA		4.9	5.0	5.2	5.7	–	3.8	4.9	4.8	4.3	4.6	4.8	●	↓	-0.06
Olympic, WA		–	1.6	1.6	1.8	1.5	1.8	–	1.8	1.3	1.2	1.6	●	⇩	-0.04
Organ Pipe Cactus, AZ		15.8	11.6	9.4	4.5	8.2	12.8	23.1	14.4	–	19.0	13.2	○	⇧	+0.97
Rocky Mountain, CO		15.8	16.3	17.1	14.2	20.9	16.5	17.2	15.1	18.7	16.7	16.8	●	⇧	+0.15
Sequoia, CA		22.0	8.4	13.0	7.6	11.2	6.3	3.4	6.7	8.2	–	9.6	⊙	↓	-0.96
Shenandoah, VA		12.9	15.0	10.0	13.2	14.1	–	15.9	14.7	–	12.7	13.6	○	⇧	+0.19
Theo. Roosevelt, ND		14.2	14.7	13.3	12.1	16.1	15.0	15.7	–	–	14.6	14.4	⊙	⇧	+0.17
Yellowstone, WY		11.6	9.7	8.5	8.1	10.3	7.7	6.7	9.5	8.1	9.7	9.0	⊙	⇩	-0.23
Yosemite, CA		–	6.8	6.1	–	7.8	4.0	2.8	5.7	9.6	7.5	6.3	●	⇧	+0.14
	Average	13.7	11.4	12.5	11.1	13.1	11.9	12.6	13.5	12.4	13.2	12.5			

Symbols:

"–" indicates insufficient or no data

Park Air Quality Status		Trend	
Much Worse than NPS Average	●	Significant Improvement**	↓
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	↑
Much Better than NPS Average	●	No Trend	–

**Statistically significant at a=0.15

Inorganic Nitrogen Wet Deposition From Nitrate and Ammonium in U.S. National Parks
1990 – 1999: Annual Average in kilograms/hectare

Park	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, Kg/ha/yr
Acadia, ME		4.9	3.1	4.2	3.6	3.3	3.7	3.7	3.8	3.6	2.9	3.7	⊙	⇩	-0.08
Bandelier, NM		1.3	1.5	1.1	1.3	1.4	1.3	1.1	2.0	–	1.5	1.4	○	⇧	+0.03
Big Bend, TX		–	1.4	1.1	1.0	1.2	1.2	1.2	1.1	1.3	0.8	1.1	○	⇩	-0.04
Bryce Canyon, UT		1.3	–	–	–	1.0	0.9	–	1.6	1.2	1.1	1.2	○	⇩	-0.01
Buffalo River, AR		–	–	3.6	4.0	3.8	4.2	4.7	3.2	3.9	3.2	3.8	●	⇩	-0.04
Cape Cod, MA		3.1	–	3.5	3.5	–	4.4	–	–	–	2.7	3.4	⊙	–	–
Capulin Volcano, NM		1.9	2.0	2.3	2.2	2.1	2.3	2.5	–	1.5	2.4	2.1	○	⇑	+0.05
Craters of the Moon, ID		0.9	1.2	0.8	1.2	0.9	1.4	0.7	1.0	1.5	0.8	1.0	⊙	–	0.00
Denali, AK		0.3	0.6	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.2	0.2	●	⇓	-0.02
Everglades, FL		3.0	2.6	–	–	4.0	3.4	2.4	–	4.1	2.8	3.2	⊙	⇧	+0.03
Gila Cliff Dwellings, NM		1.2	0.9	1.2	1.2	1.0	0.9	1.3	1.3	0.8	1.1	1.1	⊙	⇩	-0.01
Glacier, MT		1.7	0.9	1.2	1.3	1.2	1.4	1.4	1.2	1.0	0.9	1.2	○	⇩	-0.04
Grand Canyon, AZ		1.7	–	1.2	1.0	1.1	1.3	1.0	–	1.0	1.5	1.2	○	⇩	-0.02
Great Basin, NV		1.9	1.2	1.2	–	1.5	1.2	1.4	1.7	1.4	–	1.4	○	–	0.00
Great Smoky Mts., TN/NC		5.4	5.4	4.7	5.6	5.5	4.6	5.8	6.7	5.9	4.3	5.4	●	⇧	+0.07
Guadalupe Mts., TX		–	1.4	2.0	1.5	1.7	1.8	1.6	1.6	1.6	2.0	1.7	○	⇧	+0.01
Indiana Dunes, IN		8.0	7.4	6.3	8.3	6.2	7.4	8.4	6.5	7.1	5.3	7.1	●	⇓	-0.14
Isle Royale (Chassell), MI		4.1	3.9	3.4	3.1	3.4	4.4	4.0	3.0	3.3	3.9	3.7	⊙	⇩	-0.02
Little Big Horn, MT		1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.2	1.3	1.1	1.1	⊙	⇑	+0.02
Mesa Verde, CO		1.7	1.4	1.6	1.3	1.7	1.4	2.1	1.6	1.3	1.3	1.5	○	⇓	-0.02
North Cascades, WA		3.2	1.8	1.6	1.8	–	1.8	2.4	2.4	1.4	1.9	2.0	○	⇩	-0.01
Olympic, WA		–	1.0	1.0	1.1	1.2	1.3	–	1.5	1.0	1.3	1.2	○	⇑	+0.05
Organ Pipe Cactus, AZ		1.6	0.6	1.1	0.4	0.6	0.7	0.8	0.7	1.2	1.1	0.9	●	⇧	+0.02
Rocky Mountain, CO		2.0	1.6	1.7	1.6	1.8	2.2	1.7	1.8	2.1	2.4	1.9	○	⇑	+0.07
Sequoia, CA		3.7	1.8	3.7	2.9	2.9	3.1	1.7	1.6	4.3	–	2.8	⊙	⇩	-0.06
Shenandoah, VA		5.3	4.1	4.3	5.1	5.0	–	6.6	4.6	–	4.6	4.9	●	⇧	-0.02
Theo. Roosevelt, ND		1.5	1.5	1.3	1.6	2.2	2.5	1.9	–	–	1.3	1.7	○	⇧	+0.05
Yellowstone, WY		1.1	1.1	1.1	0.9	1.0	0.8	0.8	1.1	0.7	1.0	1.0	●	⇓	-0.02
Yosemite, CA		–	1.6	1.5	–	1.7	2.3	1.4	1.0	5.0	2.3	2.1	⊙	⇧	0.08
	Average	2.6	2.0	2.1	2.3	2.2	2.2	2.4	2.2	2.4	2.1	2.2			

Symbols: "–" indicates insufficient or no data, or no trend

Park Air Quality Status		Trend	
Much Worse than NPS Average	●	Significant Improvement**	⇓
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	⇑
Much Better than NPS Average	●	No Trend	–

**Statistically significant at a=0.15

Ozone Levels in U.S. National Parks
1990 – 1999: Average of the Daily 1-hour Maximum, May–September, in ppb

Park	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, ppb/yr
Acadia, ME		50	52	47	46	49	49	40	45	57	53	49	⊙	⇩	-0.1
Big Bend, TX		–	–	47	47	56	–	46	46	52	45	49	⊙	⇓	-0.3
Canyonlands, UT		–	–	–	55	58	56	63	56	61	62	59	⊙	⇑	+0.7
Cape Cod, MA		55	64	56	54	57	56	57	64	58	55	57	○	⇧	+0.3
Chamizal, TX		–	–	54	44	–	60	55	58	–	58	55	○	⇧	+0.9
Chiricahua, AZ		55	55	54	56	59	–	57	54	57	55	56	○	⇧	+0.2
Channel Islands, CA		–	–	55	–	–	–	49	44	47	45	48	⊙	–	–
Congaree Swamp, SC		64	–	42	51	42	54	53	49	63	61	53	○	⇧	+1.7
Cowpens, SC		59	60	62	68	62	63	64	70	73	68	65	⊙	⇑	+1.2
Craters of the Moon, ID		–	–	–	48	57	51	56	51	56	57	54	○	⇑	+1.3
Denali, AK		32	32	32	32	32	31	33	33	34	34	32	●	⇑	+0.2
Death Valley, CA		–	–	–	–	67	–	62	61	66	67	65	⊙	–	–
Everglades, FL		32	29	–	30	–	31	29	28	35	35	31	●	⇧	+0.3
Glacier, MT		44	43	42	36	45	38	45	33	45	42	41	⊙	⇩	-0.2
Grand Canyon, AZ		51	52	51	53	56	59	60	57	60	58	56	○	⇑	+1.1
Great Basin, NV		–	–	–	–	56	54	59	56	58	59	57	○	⇑	+1.0
Great Smoky Mts., TN/NC		67	61	59	69	66	–	71	72	77	78	69	◉	⇑	+1.9
Joshua Tree, CA		74	83	85	–	94	84	89	85	76	82	84	◉	⇧	+0.04
Lassen Volcanic, CA		54	53	53	51	62	55	59	52	57	63	56	○	⇑	+0.6
Mammoth Cave, KY		60	56	53	55	60	64	64	60	70	–	60	⊙	⇑	+1.4
Mesa Verde, CO		–	–	–	–	54	54	56	53	58	58	56	○	⇑	+1.0
Mount Rainier, WA		–	–	–	37	45	41	41	28	28	40	37	●	⇩	-1.1
Olympic, WA		29	29	30	28	29	32	32	27	29	28	29	●	⇩	-0.1
Pinnacles, CA		64	66	65	64	63	65	70	63	63	63	65	⊙	⇓	-0.2
Rocky Mountain, CO		47	56	57	59	62	59	62	58	63	58	58	⊙	⇑	+1.0
Saguaro, AZ		62	62	63	65	69	65	60	65	65	60	64	⊙	⇩	-0.02
Sequoia, CA		79	76	83	85	86	73	84	75	74	79	79	◉	⇩	-0.3
Shenandoah, VA		62	68	60	64	62	67	64	63	74	71	66	⊙	⇑	+0.9
Theo. Roosevelt, ND		46	48	45	42	47	47	49	50	–	47	47	⊙	⇧	+0.3
Voyageurs, MN		34	34	39	36	39	43	44	45	44	40	40	⊙	⇑	+1.2
Yellowstone, WY		38	47	47	46	53	51	52	49	52	56	49	⊙	⇑	+1.1
Yosemite, CA		–	–	–	–	74	69	73	61	70	71	70	◉	⇩	-0.6
	Average	53	54	53	51	57	54	56	53	57	56	55			

Symbols: "–" indicates insufficient or no data, or no trend

Park Air Quality Status		Trend	
Much Worse than NPS Average	◉	Significant Improvement**	⇓
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	⇑
Much Better than NPS Average	●	No Trend	–

**Statistically significant at a=0.15

Ozone Levels in U.S. National Parks
1990 – 1999: Annual 4th Highest 8-hour Average, in ppb

Park	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg	Status	Trend	Slope, ppb/yr
Acadia, ME		89	95	80	80	74	92	73	77	88	92	84	⊙	⇩	-0.7
Big Bend, TX		–	57	61	63	69	65	73	63	70	64	65	⊙	↑	+1.2
Canyonlands, UT		–	–	60	63	68	63	74	67	71	73	67	⊙	↑	+1.8
Cape Cod, MA		97	111	96	88	88	105	96	100	84	101	97	●	⇩	-0.5
Chamizal, TX		–	–	72	59	75	84	78	71	88	71	75	○	⇧	+1.5
Chiricahua, AZ		69	71	65	68	71	69	72	65	67	72	69	○	⇧	+0.1
Channel Islands, CA		56	80	81	–	–	–	75	63	66	69	70	○	⇩	-1.0
Congaree Swamp, SC		88	59	66	62	64	76	74	65	81	80	72	○	↑	+1.7
Cowpens, SC		74	77	85	82	82	84	80	90	96	94	84	⊙	↑	+2.0
Craters of the Moon, ID		–	–	42	55	63	57	64	60	65	68	59	●	↑	
Denali, AK		48	49	50	48	49	53	53	51	54	54	51	●	↑	+0.7
Death Valley, CA		–	–	–	–	84	67	78	77	82	79	78	⊙	⇧	+0.3
Everglades, FL		60	58	61	64	64	58	63	66	72	67	63	⊙	↑	+1.0
Glacier, MT		50	51	51	44	55	43	57	40	53	50	49	●	–	+0.0
Grand Canyon, AZ		65	72	68	64	69	69	73	72	72	76	70	○	↑	+1.0
Great Basin, NV		–	–	–	51	69	67	74	74	70	72	68	○	↑	+1.7
Great Smoky Mts., TN/NC		92	79	88	88	93	99	88	98	110	106	94	●	↑	+2.6
Joshua Tree, CA		95	107	106	92	112	103	109	117	110	101	105	●	⇧	+0.8
Lassen Volcanic, CA		78	66	66	64	78	74	73	67	78	84	73	○	↑	+1.2
Mammoth Cave, KY		83	78	73	72	75	88	82	85	97	98	83	⊙	↑	+2.5
Mesa Verde, CO		–	–	–	58	62	63	72	62	68	69	65	⊙	↑	+1.5
Mount Rainier, WA		–	–	–	55	67	65	65	40	51	64	58	●	⇩	-0.6
Olympic, WA		46	41	46	42	41	44	46	45	41	43	44	●	–	+0.0
Pinnacles, CA		83	84	84	82	78	83	94	76	88	82	83	⊙	⇩	-0.1
Rocky Mountain, CO		57	76	71	71	76	76	72	70	80	74	72	○	⇧	+0.5
Saguaro, AZ		75	73	74	82	80	83	76	79	76	69	77	⊙	–	+0.0
Sequoia, CA		96	97	102	106	106	95	105	97	94	97	100	●	⇩	-0.2
Shenandoah, VA		86	83	77	83	83	87	81	89	107	93	87	●	↑	+1.5
Theo. Roosevelt, ND		62	60	57	55	57	58	59	71	56	58	59	●	⇩	-0.2
Voyageurs, MN		52	50	63	58	60	70	67	71	67	74	63	⊙	↑	+2.4
Yellowstone, WY		54	57	63	53	61	60	61	61	66	70	61	⊙	↑	+1.3
Yosemite, CA		78	98	91	–	94	91	90	81	94	85	89	●	⇩	-1.7
	Average	72	73	71	67	73	74	75	72	77	77	73			

Symbols:

Numbers in RED exceed national ambient air quality standard
"–" indicates insufficient or no data, or no trend

Park Air Quality Status		Trend	
Much Worse than NPS Average	●	Significant Improvement**	⇩
Worse than NPS Average	⊙	Improvement	⇩
NPS Average	○	Degradation	⇧
Better than NPS Average	⊙	Significant Degradation**	↑
Much Better than NPS Average	●	No Trend	–

** Statistically significant at a=0.15